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Design of smart waste bin and prediction algorithm for waste management in household area (Article)

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Abstract

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Maintaining current municipal solid waste management (MSWM) for the next ten years would not be efficient anymore as it has brought many environmental issues such as air pollution. This project has proposed Artificial Neural Network (ANN) based prediction algorithm that can forecast Solid Waste Generation (SWG) based on household size factor. Kuliyah of Engineering (KOE) in International Islamic University Malaysia (IIUM) has been chosen as the sample size for household size factor. A smart waste bin has been developed that can measure the weight, detect the emptiness level of the waste bin, stores information and have direct communication between waste bin and collector crews. This study uses the information obtained from the smart waste bin for the waste weight while the sample size of KOE has been obtained through KOE's department. All data will be normalized in the pre-processing stage before proceeding to the prediction using Visual Gene Developer. This project evaluated the performance using R2 value. Two hidden layers with five and ten nodes were used respectively. The result portrayed that the average rate of increment of waste weight is 2.05 percent from week one until week twenty. The limitation to this study is that the amount of smart waste bin should be replicated more so that all data for waste weight is directly collected from the smart waste bin. © 2018 Institute of Advanced Engineering and Science. All rights reserved.

Author keywords

- ANN prediction algorithm
- MSWM in household area
- Prediction of SWG
- Smart waste bin
- Visual gene developer

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